

# BI-85

## SERVICE MANUAL

US Model  
Canadian Model  
AEP Model  
UK Model



Photo : US model

Model Name Using Similar Mechanism	BM-88
Tape Transport Mechanism Type	MB-85-59

### SPECIFICATIONS

Recording system	4-track 2-channel monaural (L channel for electronic index signals, R channel for sound signals)
Tape speed	4.8 cm/s (1 7/8 in./s)
Fast winding time	Approx. 2 min. 20 sec. with Sony cassette DC-90
Frequency response	200 – 8,000 Hz
Speaker	Approx. 5.7 cm (2 1/4 in.) dia.
Power output	350 mW (at 10% distortion)
Input	TELEPHONE PICKUP (minijack) Sensitivity 0.2 mV Input impedance 10 kohms
Output	EARPHONE (minijack) for 8 – 300-ohm earphones
CONTROL UNIT connector	for HU-80 or FS-75
Power requirements	9V DC DC IN 9V jack accepts the supplied AC power adaptor for use on 120V AC, 60Hz (US, Canadian model) 220V AC, 50Hz (AEP model) 240V AC, 50Hz (UK model)
Power consumption	with the supplied AC power adaptor 14W (US, Canadian model) 13W (AEP, UK model)
Dimensions	Approx. 200 × 70 × 245 mm (w/h/d) (7 7/8 × 2 7/8 × 9 3/4 in.) including projecting parts and controls
Mass	Approx. 1.2 kg (2 lb. 11 oz.)
Supplied accessory	AC power adaptor (1)

Design and specifications subject to change without notice.

#### Optional Accessories

Hand control unit	HU-80
Foot control unit	FS-75
Earphones	DE-35, DE-36
Headphones	MDR-U10M
Telephone recording adaptor	TL-4
Telephone pickup	TP-15
Message coupler	TL-2
Cassette eraser	BE-9H



The BI-85 cannot be used with the Microcassette adaptor MA-50.

Dictator/Transcriber  
**SONY**®


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### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

### ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

## SECTION 1 SERVICING NOTE

### SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer :

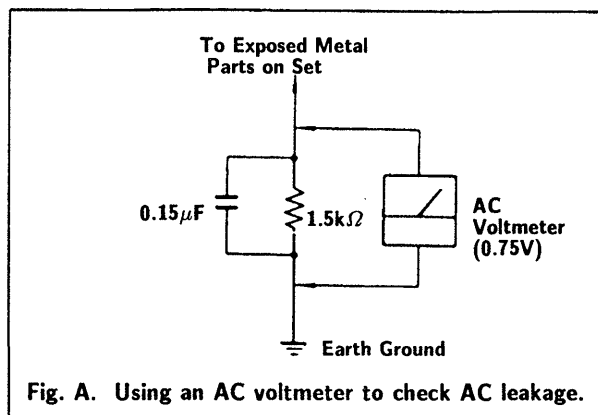
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

### LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes.).

Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)



### NOTES FOR REPAIRING

#### 1. POWER (S101) Switch

The POWER switch is not for turning ON/OFF the power source. Pay attention when repairing even the POWER switch is turned off.

- The states when turning off the POWER switch are as follows.

- a. Motors (M901,902) will be stopped..
- b. Plungers (PM901 to 903) will be turned off.
- c. Amplifier output will be cut-off by muting on.

The above items from a to c are controlled by the microcomputer which marks the pin 38 of IC109 (microcomputer) become Low level.

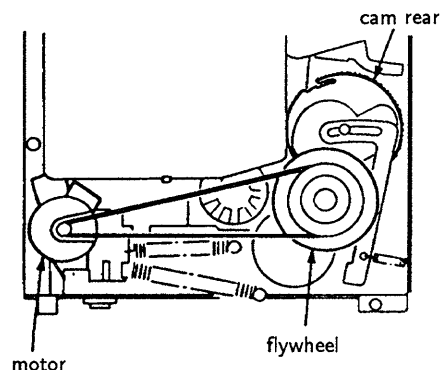
2. Be careful the short circuit when repairing since the power supply circuit does not have any protection devices.

Please note that the current shut down (D108) will be work when the power connected to the opposite way.

3. Crack of Flywheel Gear and Cam Gear

Do not turn the Flywheel counterclockwise.

The flywheel gear and cam gear may be crack when turn the flywheel counterclockwise.



SECTION 2  
GENERAL

This section is extracted from  
instruction manual.

Precautions (US model)

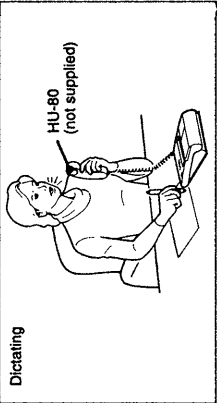
- Operate the unit only on 9 V DC.  
For the AC operation, use the AC power adaptor supplied with the unit. Do not use any other AC power adaptor as it may cause a malfunction of the unit.
  - Unplug the AC power adaptor from the wall outlet when it will not be used for an extended period of time. To disconnect the adaptor, pull it out by grasping the adaptor itself. Never pull it by the cord.
  - Do not place the unit in a location near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
  - Allow adequate air circulation to prevent an internal heat build-up. Do not place the unit near materials (curtains, draperies, etc.) that may block the ventilation holes.
  - Should any solid object or liquid fall into the unit, unplug the unit and have it checked by qualified personnel before operating it any further.
  - The supplied AC power adaptor becomes hot if it is connected to a wall outlet for a long period of time. However, this will not cause any mechanical problems.
- If you have any questions or problems concerning your unit that are not covered in this manual, please consult the Sony dealer from whom you purchased the unit.

Precautions (Canadian, AEP, UK model)

- Operate the unit only on 9 V DC.  
For the AC operation, use the AC power adaptor supplied with this unit. Do not use any other AC power adaptor as it may cause a malfunction of the unit.  
Before operating the unit, check that the operating voltage of your AC power adaptor is identical with the voltage of your local power supply.
- | Where purchased                | Operating voltage |
|--------------------------------|-------------------|
| United Kingdom                 | 240 V AC          |
| Continental European countries | 220 V AC          |
| Canada                         | 120 V AC          |
- Unplug the AC power adaptor from the wall outlet when it will not be used for an extended period of time. To disconnect the adaptor, pull it out by grasping the adaptor (model for Canada) or the AC plug (model for U.K. and continental European countries). Never pull it by the cord.
  - Do not place the unit in a location near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
  - Allow adequate air circulation to prevent an internal heat build-up. Do not place the unit near materials (curtains, draperies, etc.) that may block the ventilation holes.
  - Should any solid object or liquid fall into the unit, unplug the unit and have it checked by qualified personnel before operating it any further.
  - The supplied AC power adaptor becomes hot if it is connected to a wall outlet for a long period of time. However, this will not cause any mechanical problems.
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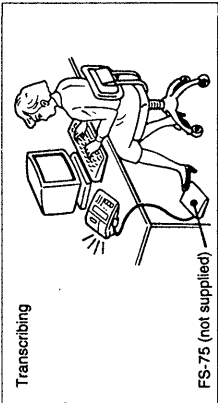
Features

- The Sony BI-85 dictatortranscriber is designed to be used for both dictating and transcribing.
- As a dictator**
- The Sony HU-80 hand control unit (not supplied) remotely controls the BI-85 dictatortranscriber.
  - Electronic index signal — "LTR" (letter=end of document) signal — can be recorded on a tape while the unit is set in the recording (dictating), telephone recording, stop or playback mode.
  - Alarm sound informs a recording error.
  - Recording of telephone calls can be performed with the use of the TL-4 telephone recording adaptor, the TL-2 message coupler or the TP-15 telephone pickup (not supplied).
  - With the use of the optional earphones DE-35, DE-36 or headphones MDR-UT0M, you can monitor the sound with the desired sound level during recording.



As a transcriber

- Auto stop function quickly accesses the dictated material.
- Auto backspace function with the REVERSE TIME control makes transcribing easy by enabling the reviewing of the last recorded words each time the playback is resumed.
- Rapid erasing function with the ● ERASE button and the < REW button.



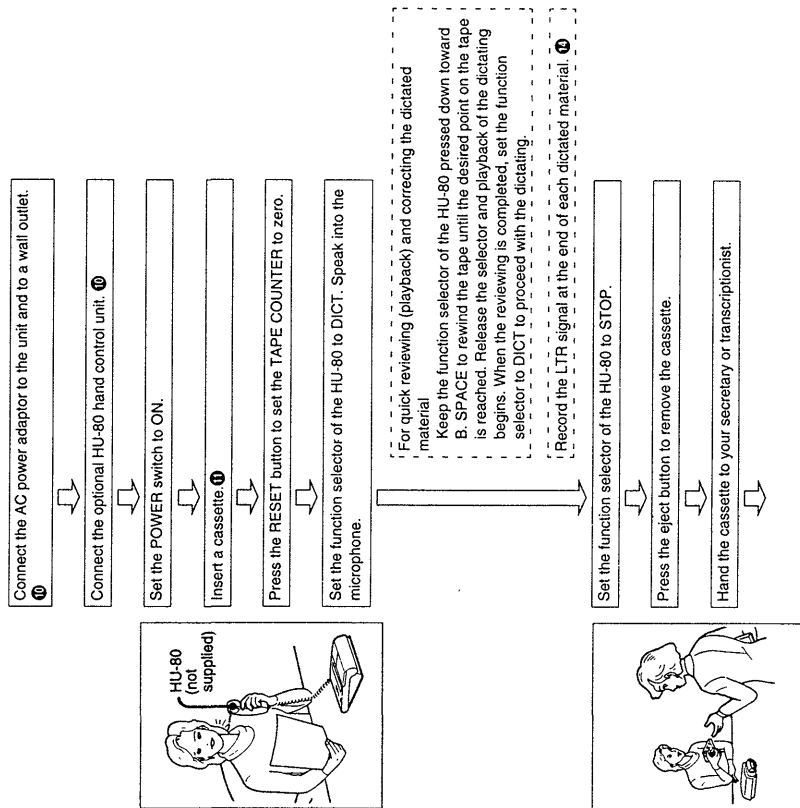
# Operation Flow Chart

For details, refer to the pages in ●.

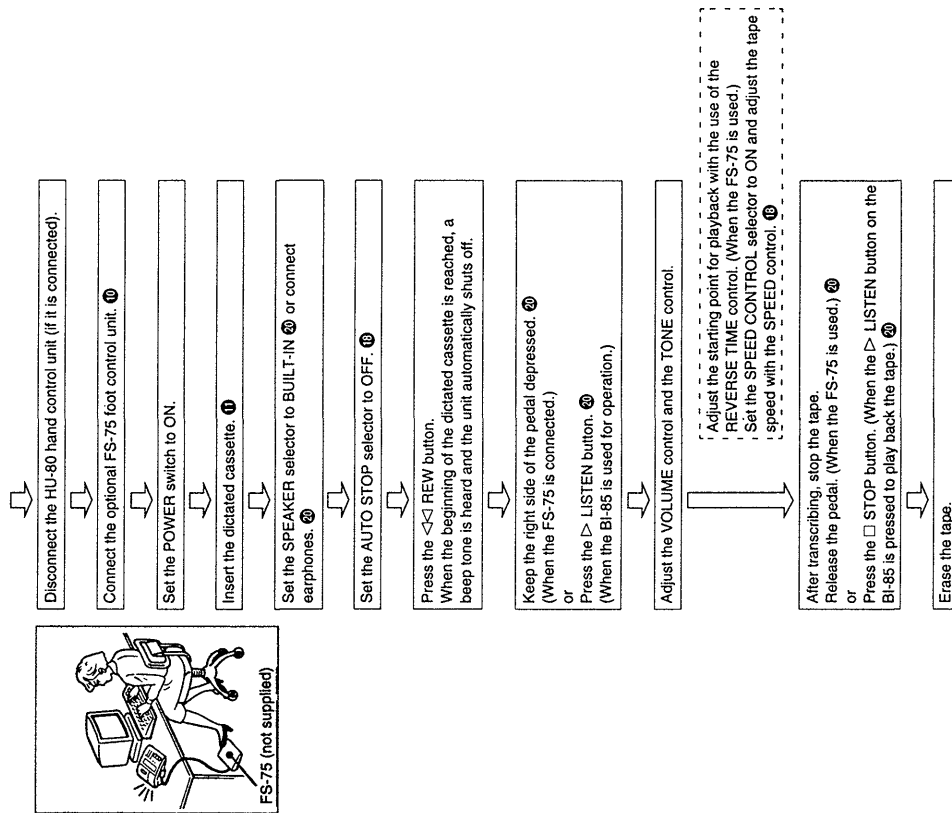
—: Necessary step

- - - - -: Optional step

## Dictating ●

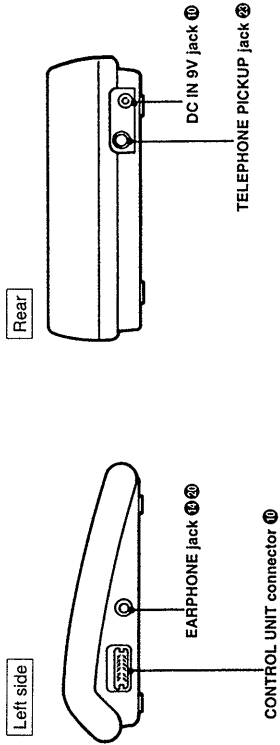
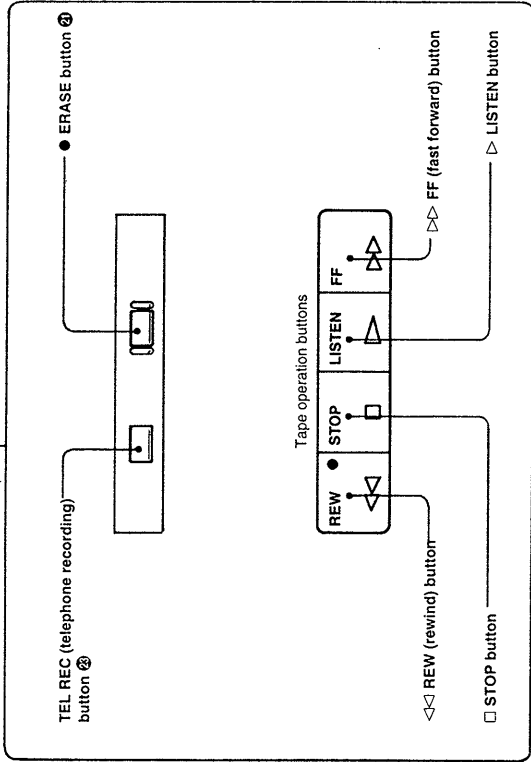
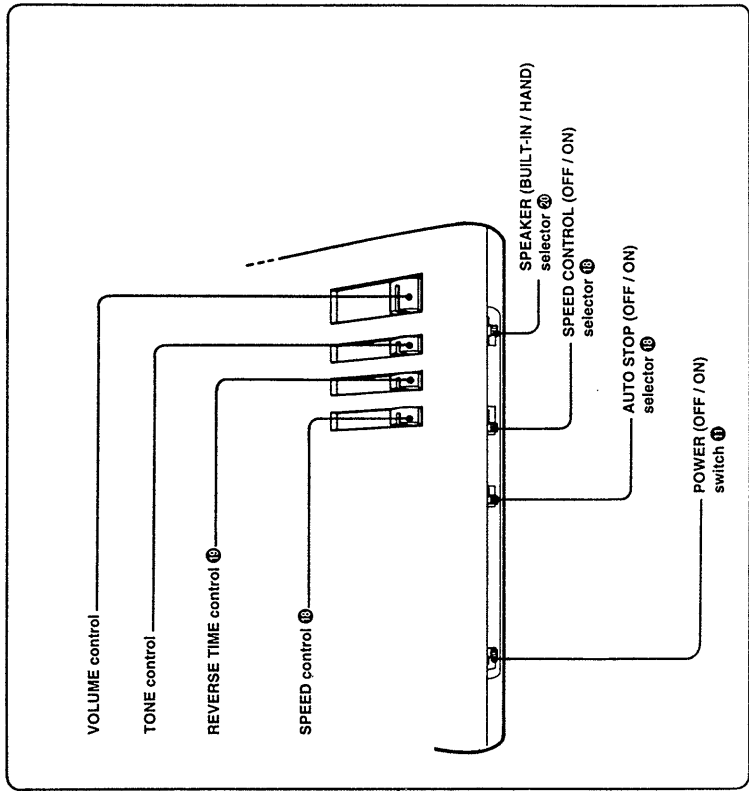
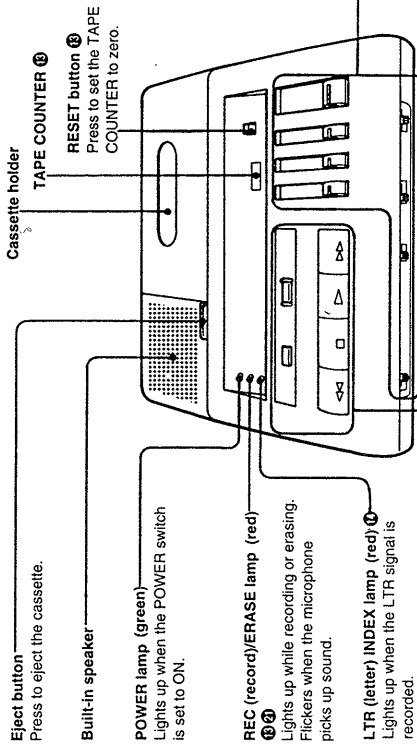


## Transcribing ⑦



# Location and Function of Controls

For details, refer to the pages indicated in ●.

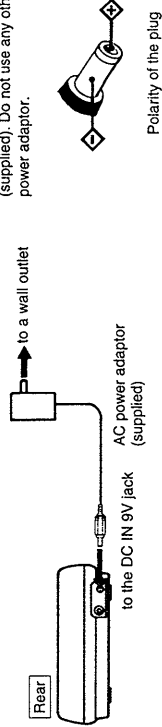


# Preparation

## Connecting the Power Source

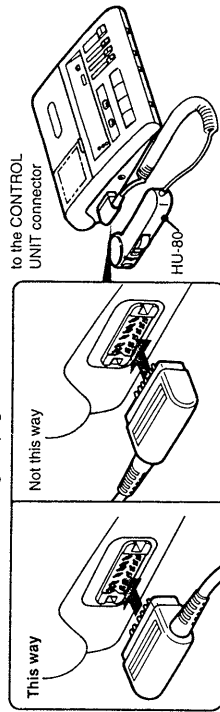
### Note on the AC power adaptor

Use only the AC power adaptor (supplied). Do not use any other AC power adaptor.



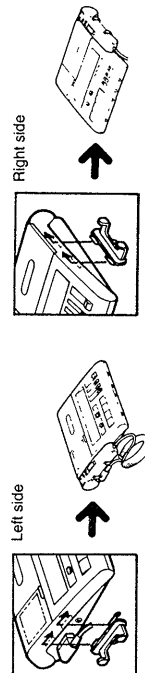
## Connecting the HU-80 Hand Control Unit (not supplied)

For operation, refer to "Dictating" on page 13.



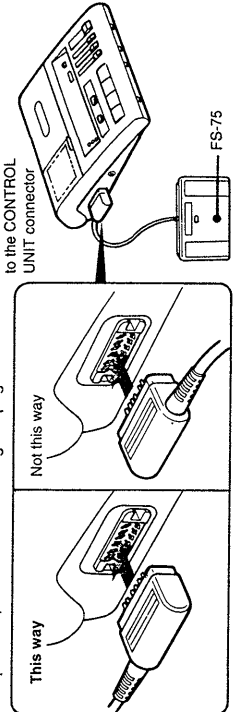
### Attaching the cradle

Attach the cradle which is supplied to the HU-80 to the left or right side of the unit. Place the HU-80 hand control unit on the cradle while not in use. Insert the cradle into the slots and slide to secure it.

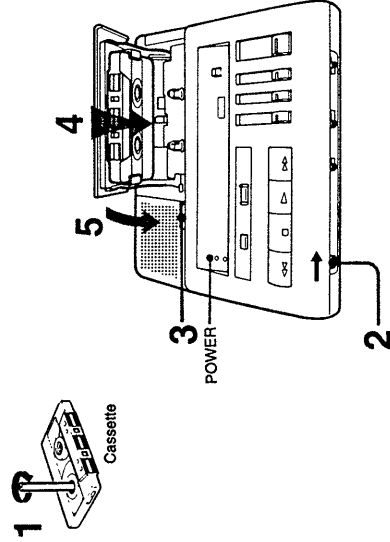


## Connecting the FS-75 Foot Control Unit (not supplied)

For operation, refer to "Transcribing" on page 17.



## Inserting a Cassette



- 1 Take up any slack in the tape.
- 2 Set the POWER switch to ON.  
The POWER lamp lights up.
- 3 Press the eject button to open the cassette holder.
- 4 Insert a cassette into the cassette holder with the side to be recorded or played back facing upward.
- 5 Close the cassette holder.

## Preparation

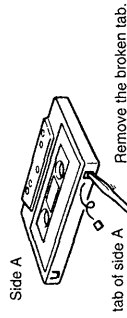
### ■ Notes on cassettes

- Any standard cassette can be used, but the optional Sony leaderless cassette DC-60 or DC-90 is recommended. The use of a TYPE II (CrO<sub>2</sub>) or TYPE IV (Metal) cassette is not advisable.
- Choose a cassette of suitable length. The recording time on each side of these cassettes is as follows:  
 Sony DC-60 Approx. 30 minutes  
 Sony DC-90 Approx. 45 minutes
- The use of cassettes whose running time is longer than 90 minutes (total time) are not advisable.
- The letter A on the Sony cassette is embossed to help you distinguish that side of the cassette in a dimly lit area.

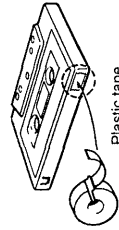
### To prevent accidental erasure

When the unit is operated in the recording mode, any previous recordings will be automatically erased. For this reason, cassettes incorporate a safety device to prevent any accidental erasure. When the small tabs at the rear of a cassette are broken off, an interlock on the unit will be activated, preventing recording.\*

To protect the recording on side A, break off the tab of that side.  
 To protect the recording on side B, break off the tab of that side.



To reuse a cassette for recording after the tabs have been removed, simply cover each slot with a small piece of plastic tape. Do not stick any material on any other part of the cassette except the circled part, as illustrated below.

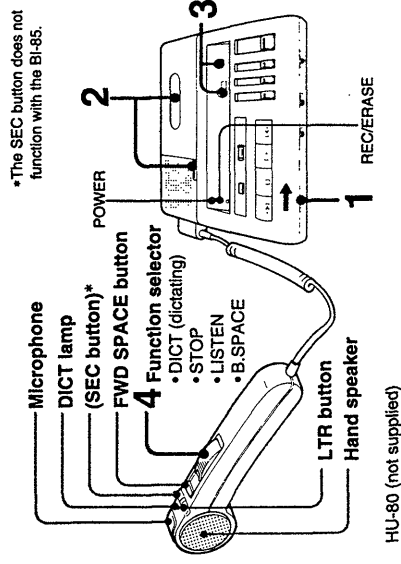


\*When the cassette is loaded for telephone recording with the tabs broken off and the TEL REC button is pressed, the beep tone is heard and the TEL REC button does not operate.  
 When the cassette is loaded for dictating with the tabs broken off and the function selector is set to DICT, recording cannot be made and the beep tone is heard.

## Dictating

To use the unit as a dictating machine, connect the HU-80 hand control unit (not supplied).  
 For the connection instructions, see page 10.

### Operation



- 1 Set the **POWER** switch to ON.  
 The **POWER** lamp lights up.
- 2 Insert a cassette. (See page 11.)
- 3 Press the **RESET** button to set the **TAPE COUNTER** to zero.
- 4 Set the function selector to **DICT**.  
 Recording starts. Speak into the microphone.  
 The **DICT** lamp (HU-80) lights up and **REC/ERASE** lamp (BI-85) flickers when the microphone picks up the sound.

**To stop the tape**  
 Set the function selector to **STOP**.

### Note

Keep the HU-80 away from the BI-85 during recording.  
 If not, noise may be recorded.



## Dictating

### Useful Functions

#### ■ LTR (letter) signal

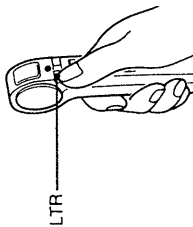
You can record electronic index signals on the tape with the HU-80 while the unit is set in the recording (dictating), telephone recording, stop or playback mode.

LTR (letter=end of document) signal: Record at the end of each dictated material.

When the Auto stop function (page 18) is activated (AUTO STOP-ON), the tape automatically stops at each index signal when it is rewound or fast forwarded. Dictated material can be located without the user's having to listen to the entire tape.

#### To record the LTR signal

Press the LTR button on the HU-80.  
Each time the button is pressed, the LTR INDEX lamp (BI-85) lights up for about 3 seconds.

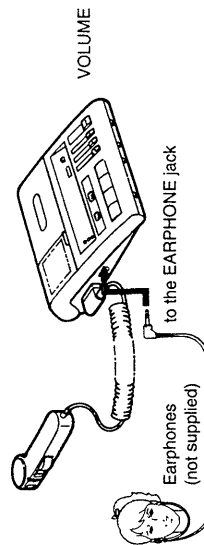


#### Notes

- The LTR signal should be recorded with the intervals of more than 6 seconds.
- Playback sound is muted while the LTR signal is recorded. However, the recorded material will be protected.
- While the LTR signal is being recorded with the SPEED CONTROL selector set to ON, the tape will run at the normal tape speed.

#### ■ Monitoring while dictating

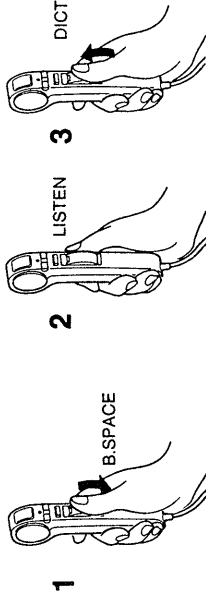
The recording can be monitored through the earphones. Connect the Sony earphones DE-35, DE-36 or headphones MDR-U10M (not supplied) to the EARPHONE jack located on the left side of the unit. Adjust the VOLUME control if necessary.



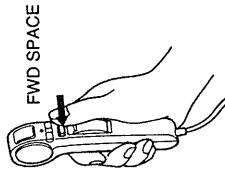
#### ■ Quick reviewing (playback) and correcting the dictated material

You can easily play back the dictated material and correct it if necessary.

- 1 Keep the function selector of the HU-80 pressed down toward B.SPACE to rewind the tape.
- 2 Release the selector. Playback of the dictating begins.
- 3 When the reviewing is completed, set the function selector to DICT to proceed with the dictating.



To fast forward the tape, keep the FWD SPACE button of the HU-80 pressed until the desired section is located.



## Dictating

### Tips for a More Efficient Dictating

#### Before you start dictating

- Organize your thoughts.
- Make notes or an outline of what you want to dictate.
- Check that the cassette is erased. (See page 21.)

#### When you start dictating

- Identify yourself. (Name, department, phone number, etc.)
- Indicate the type of dictating. (Memo, letter, etc.)
- Give transcribing instructions. (Type of stationery, number of copies, envelopes, etc.)
- Specify distribution. (Name, addresses, etc.)

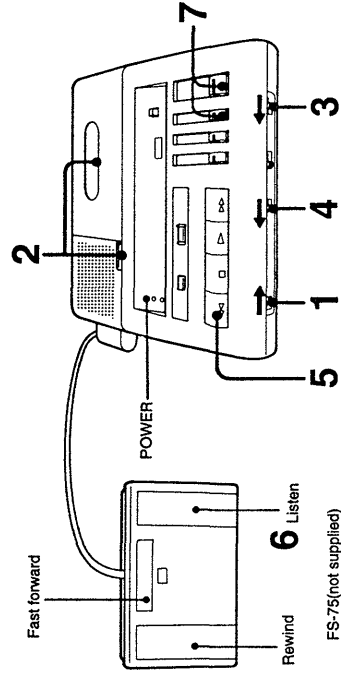
#### During dictating

- Relax and speak clearly, at normal speed.
- Short sentences are best.
- Include punctuation.
- Spell difficult or unusual words.
- Correct your mistakes. (Review and redictate.) (See page 15.)
- At the end of each dictated material, record an LTR signal. (See page 14.)

## Transcribing

To use the unit as a transcribing machine, connect the FS-75 foot control unit (not supplied). For the connection instructions, see page 10.

### Operation



- 1 Set the POWER switch to ON.**  
The POWER lamp lights up.
- 2 Insert the dictated cassette.** (See page 11.)
- 3 Set the SPEAKER selector to BUILT-IN.**
- 4 Set the AUTO STOP selector to OFF.** (See page 18.)
- 5 Press the << REW button to rewind the tape.**  
When the tape reaches the beginning of the dictated cassette, a beep tone is heard and the unit automatically shuts off.
- 6 Keep the right side of the pedal of the FS-75 depressed to play back the tape.**
- 7 Adjust the VOLUME control and the TONE control.**

**To stop the tape**  
Release the pedal of the FS-75.

**To rewind the tape**  
Keep the left side of the pedal of the FS-75 depressed.

**To fast forward the tape**  
Keep the center top of the pedal of the FS-75 depressed.

## Transcribing

### Useful Functions

#### ■ Auto stop function

With the Auto stop function, recorded documents can be located without the user's having to listen to the entire tape. This function activates only in the rewind or fast forward mode.

When the **AUTO STOP selector is set to ON**, the tape automatically stops at each LTR signal previously recorded on the tape. (See "LTR signal" on page 14.)

#### Notes

- The tape does not stop at the LTR signal even if the AUTO STOP selector is set to ON while the  $\Delta$  FF button or the  $\Delta$  REW button is continuously depressed.
- When the AUTO STOP selector is set to ON, the tape automatically stops at each SEC signal previously recorded on the tape with the Sony Professional Dictation Machine (BM-88 etc.).

When the **AUTO STOP selector is set to OFF**, the tape does not stop even if the electronic index signals have been previously recorded.

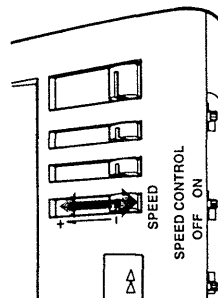
#### Notes

- E-INDEX signal of the Sony conventional models (BM-12, 17, 18, etc.) corresponds to the LTR signal of BI-85.
- LTR signal and E-INDEX signal do not correspond to the cue signals used for the consumer type tape recorder.
- Set the AUTO STOP selector to OFF to transcribe either a music cassette or a cassette which has not been recorded with the Sony Professional Dictation Machine (BM-12, 17, 18, 75, 80, 88, BI-85 etc.), otherwise the tape may automatically stop in the rewind or fast forward mode.

#### ■ Controlling the speed

Set the **SPEED CONTROL selector\*** to ON to adjust the tape speed with the **SPEED control**. The tape can be played back at a speed faster or slower than normal. Set the **SPEED CONTROL selector** to OFF to transcribe the dictated material at the normal speed.

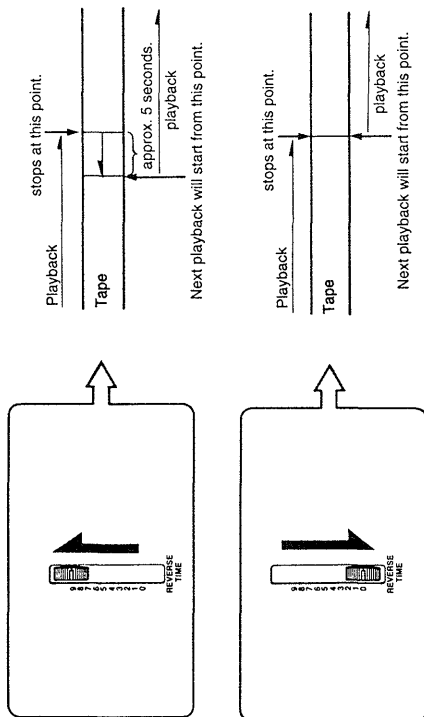
\*Tape speed can be changed in the range of approximately -20% to +50% with the use of the **SPEED control**.



#### ■ Auto backspace function

This function operates only when the FS-75 foot control unit is connected. With the use of the **REVERSE TIME control**, the tape is rewound a little each time it is stopped. Then, the last few recorded words can be reviewed when you resume playback. Adjust the **REVERSE TIME control** to determine the length of the tape to be rewound. At "9" position, the tape is rewound so that the dictated material can be reviewed for approximately 5 seconds\*. At "0" position, the tape stops without being rewound at all.

\*Measured at some point near the middle of the tape. The reverse time will vary in accordance with the remaining length of the tape.



Set the **REVERSE TIME control** to the desired position and keep the right side of the pedal of the FS-75 depressed to play back the tape.

Transcribing

Tape transport operation

	BI-85	HU-80	FS-75
Rewind	Press the << REW button.	Keep the function selector pressed down toward B. SPACE.	Keep the left side of the pedal depressed.
Stop	Press the □ STOP button.	Set the function selector to STOP.	Release the pedal.
Listen	Press the ▷ LISTEN button.	Set the function selector to LISTEN.	Keep the right side of the pedal depressed.
Fast forward	Press the >> FF button.	Keep the FWD SPACE button pressed.	Keep the top center of the pedal depressed.

Private listening

Connect a Sony earphones DE-35, DE-36 or headphones MDR-U10M (not supplied) to the EARPHONE jack.  
The sound will be heard through the earphones and the speaker will be disconnected.

Selecting the speaker

You can play back the dictated material through the built-in speaker or the speaker on the HU-80 by setting the SPEAKER selector to BUILT-IN or HAND.

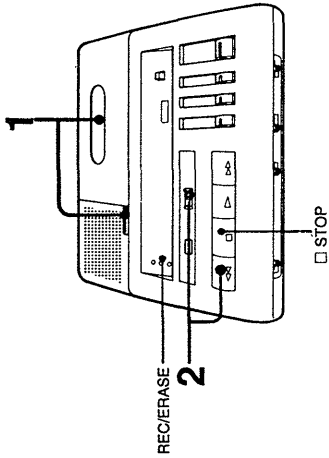


Tips on Transcribing

- Before typing, check the number of the dictated material and review the contents using the auto stop function.
- Erase the tape when transcribing is finished.

Erasing

The recording can be erased rapidly.






- 1 Insert the cassette with the side to be erased facing upward.**  
Be sure not to rewind the tape after transcribing. The end section of the dictated material to be erased should be positioned at the recording head.
- 2 Keep the ● ERASE button pressed and then press the << REW button.**  
The REC/ERASE lamp lights up. The section of the tape being rewind is erased.

**To stop the tape**  
Press the □ STOP button.

For easier and quicker erasure of the entire cassette, use the Sony BE-9H cassette eraser (not supplied).

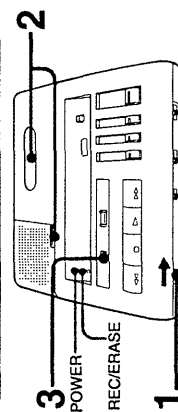
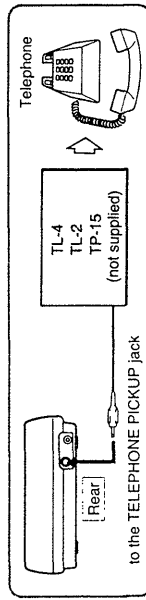
# Alarm System

The alarm system is activated in the following situations.

Alarm system	Situation	To release alarm system
When you press a button, 	<ul style="list-style-type: none"><li>No cassette is inserted.</li><li>The cassette's safety tabs have been removed.</li></ul>	First, release the button, then • Insert a cassette.
When the unit shuts off,  (about 2 seconds)	<ul style="list-style-type: none"><li>The end of the tape has been reached.</li><li>The tape is torn.</li></ul>	Rewind the tape. Insert a new cassette.
When the unit shuts off,  (about 0.5 second)	The LTR signal is detected while the tape is wound rapidly (in the fast forward or rewind mode) when the AUTO STOP selector is set to ON.	The beep tone stops after about 0.5 second.

(Canadian, AEP, UK model)

To record a telephone conversation, connect the TL-4\* telephone recording adaptor, the TL-2\* message coupler or the TP-15\* telephone pickup (not supplied) to the TELEPHONE PICKUP jack. For further details, refer to the instruction manual of the telephone recording device.



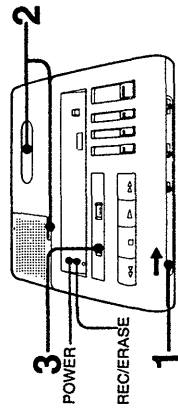
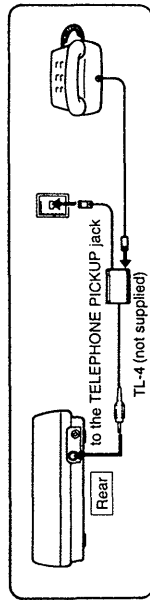
\*The TL-4, TL-2 and TP-15 cannot be used on some telephones.

- 1 Set the **POWER** switch to **ON**.  
The **POWER** lamp lights up.
- 2 Insert a cassette. (See page 11.)
- 3 Keep the **TEL REC** button pressed for more than a second.  
Telephone recording begins. The **REC/ERASE** lamp flickers when the sound through the telephone is recorded.

# Telephone Recording

(US model)

To record a telephone conversation, connect the TL-4 telephone recording adaptor (not supplied)\* to the TELEPHONE PICKUP jack. For further details, refer to the instruction manual of the telephone recording adaptor.



\*The TL-4 telephone recording adaptor cannot be used on some telephones.

- 1 Set the **POWER** switch to **ON**.  
The **POWER** lamp lights up.
- 2 Insert a cassette. (See page 11.)
- 3 Keep the **TEL REC** button pressed for more than a second.  
Telephone recording begins. The **REC/ERASE** lamp flickers when the telephone recording adaptor picks up the sound.

**To stop the tape**  
Press the ☐ **STOP** button.

**At the beginning of telephone recording**  
The **LTR** signal is automatically recorded.  
While the **LTR** signal is being recorded (for about 3 seconds), the unit cannot be stopped even though the ☐ **STOP** button is pressed.

**During telephone recording**  
Only the **LTR** button (**HU-80**) and the ☐ **STOP** button (**BI-85**) are operative.

## SECTION 3 MECHANICAL ADJUSTMENTS

### PRECAUTION

1. Clean the following parts with a denatured alcohol-moistened swab :  
     record/playback/erase head    pinch roller  
     rubber belts                      capstan
2. Demagnetize the record/playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustment.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.

### Torque Measurement

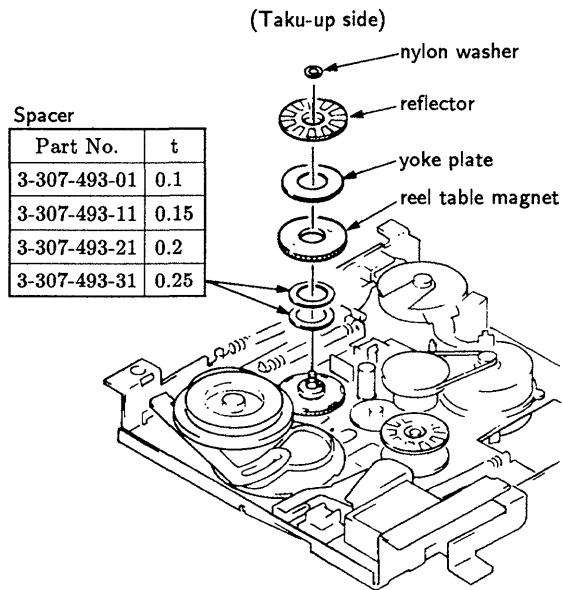
Mode	Torque meter	Meter reading
Forward	CQ-102C	20 - 45g-cm (0.28 - 0.62oz-inch)
Fast Forward, Rewind	CQ-201B	80 - 200g-cm (1.11 - 2.78oz-inch)
Forward Back Tension	CQ-102C	4 - 8g-cm (0.056 - 0.112oz-inch)

### Tape Tension Measurement

Mode	Tension meter	Meter reading
Forward	CQ-403A	100 - 170g (3.5 - 6.0oz)

### Forward Torque Adjustment

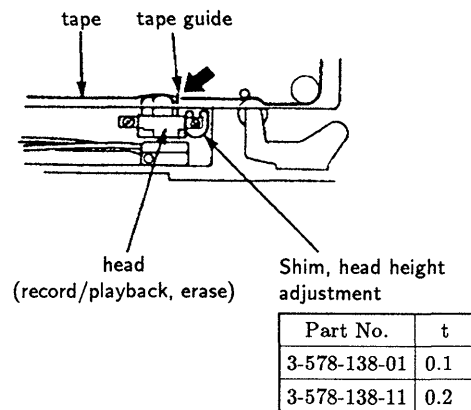
Torque meter	Meter reading	Procedure
CQ-102C	20 - 45g-cm (0.28 - 0.62oz-inch)	Adjust the forward torque by replace the spacer shown in below chart.



### Head Height Adjustment

#### Procedure :

1. Insert the mirror cassette (CQ-009C).
2. In playback mode and viewing from the front, adjust the head heights to eliminate tape curl and tape twist at shown by arrows.
3. After the adjustments, apply suitable locking compound to screws.



## SECTION 4 ELECTRICAL ADJUSTMENTS

### PRECAUTION

- Switches and controls should be set to the positions as follows unless otherwise specified.

#### ● Switch positions

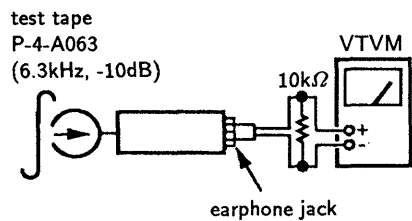
POWER switch	: ON
AUTO STOP switch	: ON
SPEAKER switch	: BULT-IN
TONE control	: max. (H)
VOLUME control	: mechanical mid
SPEED CONTROL switch	: OFF
REVERSE TIME control	: 0

- Standard Input Level :  
TELEPHONE PICKUP jack :  $300\Omega$  0.77mV (−60dB)
- Standard Output Level :  
Speaker :  $8\Omega$  0.775V (0dB)

### Record/playback Head Azimuth Adjustment

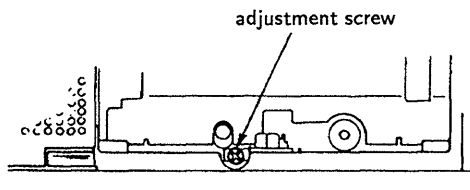
#### Procedure :

- Mode : Playback (LISTEN)



- Turn the adjustment screw to obtain the maximum reading on VTVM.  
Adjustment should be finished with the screw in tightening direction.
- After the adjustment, lock the adjustment screw with suitable locking compound.

**Adjustment Location :** record/playback head

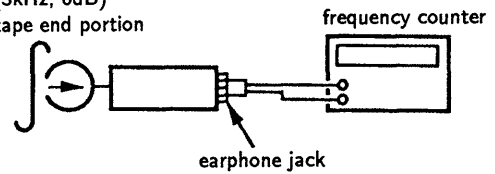


### Tape Speed Adjustment

#### Setup :

Mode : Playback (LISTEN)

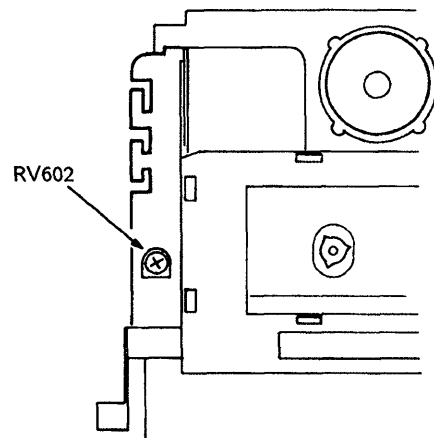
test tape  
WS-48  
(3kHz, 0dB)  
tape end portion



#### Procedure :

- SPEED CONTROL switch : OFF  
Adjust RV602 to obtain a  $3030\text{Hz} \pm 10\text{Hz}$  frequency reading.

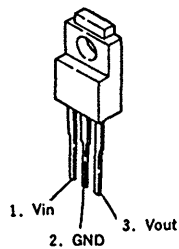
**Adjustment Location :** servo board



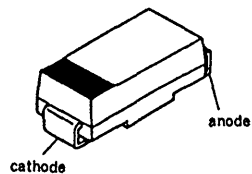
## SECTION 5 DIAGRAMS

### ● SEMICONDUCTOR LEAD LAYOUTS

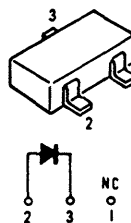
μ PC2406HF



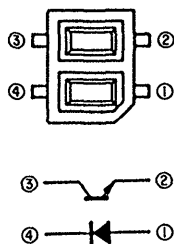
D1F10



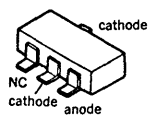
RD3.3M-B1



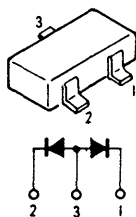
GP-2S09-C



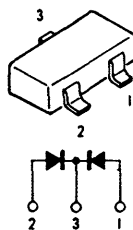
SB10-05PCP



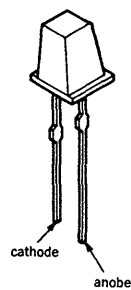
1SS181



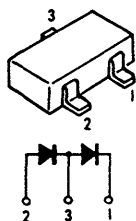
MA152WK



SLP-153B-51

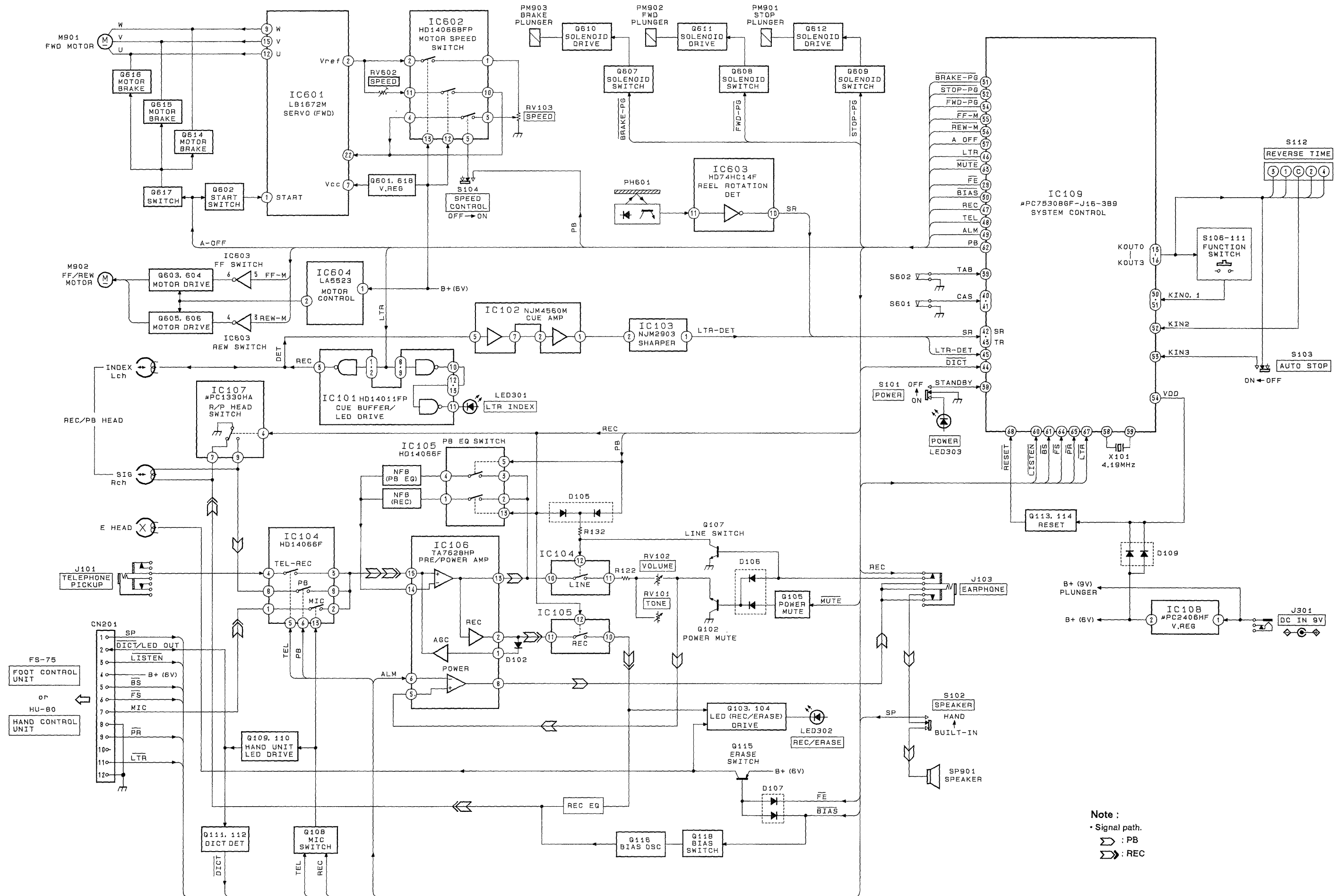


1SS226



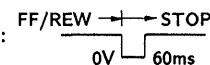
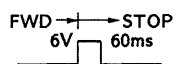






# 5-1. BLOCK DIAGRAM



# **MICRO COMPUTER $\mu$ PD75308GF-J16-3B9 (IC109)**

## 1. Terminal Description

Pin No.	Pin Name	Usage	Voltage, Remarks												
1 - 12	S12 — S23	Not used	Open												
13 - 16	KOUT 0 — KOUT 3	Key scan output													
17	MA50-OUT	Not used	Open												
18	—	Not used	Open												
19	4.8/2.4-OUT	Not used	Open												
20	—	Not used	Open												
21 - 23	COM 0 — COM 2	Not used	Open												
24	—	Not used	Open												
25	LCD-BIAS	Not used	Open												
26 - 28	VLCD0 — VLCD2	Not used	Connect to VSS												
29	FE-OUT	Fast-Erase control output	At Fast-Erase : 0V    At the other : 5.9V												
30	BIAS-OUT	BIAS control output	At DICT, TEL-REC : 0V    At the other : 5.9V												
31	BRK-PG-OUT	Brake plunger output	Normal : 6.0V    STOP from FF/REW : 												
32	STOP-PG-OUT	Stop plunger output	Normal : 0V    STOP from FWD : 												
33	VSS	GND	0V												
34	FWD-PG-OUT	FWD plunger output	At FWD : 5.9V    At the other : 0V												
35	FF-M-OUT	FF/REW motor output	<table><tr><th></th><th>At motor FF</th><th>At motor REW</th><th>At the other</th></tr><tr><td>Pin 35</td><td>0V</td><td>5.9V</td><td>5.9V</td></tr><tr><td>Pin 36</td><td>5.9V</td><td>0V</td><td>5.9V</td></tr></table>		At motor FF	At motor REW	At the other	Pin 35	0V	5.9V	5.9V	Pin 36	5.9V	0V	5.9V
	At motor FF			At motor REW	At the other										
Pin 35	0V	5.9V		5.9V											
Pin 36	5.9V	0V	5.9V												
36	REW-M-OUT														
37	A-OFF-OUT	Motor Auto-off output	Motor Auto-off (no cassette or after three minutes after STOP) : 1.9V    At the other : 0V												
38	STAND-BY	POWER switch input	POWER switch ON : 5.3V    POWER switch OFF : 0V												
39	TAB-IN	TAB (erase proof) detection switch input	<table><tr><td>Cassette with TAB : 0V, Cassette without TAB : 5.3V</td><td rowspan="3">}    Leaf switch of the mechanism deck</td></tr><tr><td>With a cassette : 0V, Without a cassette : 5.3V</td></tr><tr><td>With a cassette : 0V, Without a cassette : 5.3V</td></tr></table>	Cassette with TAB : 0V, Cassette without TAB : 5.3V	}    Leaf switch of the mechanism deck	With a cassette : 0V, Without a cassette : 5.3V	With a cassette : 0V, Without a cassette : 5.3V								
Cassette with TAB : 0V, Cassette without TAB : 5.3V	}    Leaf switch of the mechanism deck														
With a cassette : 0V, Without a cassette : 5.3V															
With a cassette : 0V, Without a cassette : 5.3V															
40	MC-IN	Cassette detection switch input													
41	CAS-IN	Cassette detection switch input													
42	SR	S reel signal input	Refer to 22 page.												
43	TR	S reel signal input	Refer to 22 page.												
44	DICT-IN	HU-DICT key input	At DICT key input of the hand control unit (HU-80) : 0V At the other : 5.3V												

Pin No.	Pin Name	Usage	Voltage, Remarks				
45	LTR-DET	LTR signal input	Count the rectangular pulse with the microcomputer				
			<table><tr><td></td><td>LTR</td></tr><tr><td>At FF/REW</td><td>600 to 4800Hz</td></tr></table>		LTR	At FF/REW	600 to 4800Hz
				LTR			
At FF/REW	600 to 4800Hz						
46	LTR-OUT	LTR signal output	At LTR oscillating :  5.3V      Output 80Hz for three seconds. At the other : 5.3V				
47	REC-OUT	DICT, TEL-REC control output	At DICT, TEL-REC : 5.0V    At the other : 0V				
48	TEL-OUT	TEL-REC control output	At TEL-REC : 5.3V    At the other : 0V				
49	ALM-OUT	Alarm output	At alarm oscillating :  5.3V    2.05kHz				
50 - 53	KIN 0 — KIN 3	key scan input					
54	VDD	Positive power source terminal of the microcomputer	5.3V				
55	XT1	Microcomputer operation mode selection input	Connect to VDD				
56	XT2	Not used	Open				
57	NC	Not used	Connect to VDD				
58	X1	Input for clock oscillation	 5Vp-p    4.19MHz				
59	X2	Input for clock oscillation	 5.5Vp-p    4.19MHz				
60	HU-LIS-IN	HU-LISTEN key input	At LISTEN key-in of the hand control unit (HU-80) : 0.8V At the other : 5.3V				
61	BS-IN	HU-BS key input	At BS key-in of the hand unit (HU-80) : 0.8V At the ther : 5.3V				
62	PB-OUT	Playback control output	At LISTEN : 5.3V    At the other : 0V				
63	MUTE-OUT	Amplifier mute output	At LISTEN, DICT, TEL-REC : 5.3V    At the other : 0V				
64	FS-IN	HU-FS key input	At FS key-in of the hand control unit (HU-80) : 0.1V At the other : 5.3V				
65	PR-IN	Foot switch LISTEN key input	At LISTEN key-in of the foot control unit (FS-75) : 0.1V At the other : 5.3V				
66	SEC-IN	Not used	Connect to VDD				
67	LTR-IN	HU-LTR key input	At LTR key-in of the hand control unit (HU-80) : 0.1V At the other : 5.3V				
68	RESET	Microcomputer reset input	Normal : 5.3V				
69 - 80	S0 — S11	Not used	Open				

#### 4. Key Scan Matrix

The pin No. and the pin name stand for those of the microcomputer (IC109).

Input \ Output		(Pin No.) 13	14	15	16
		(Pin Name) KOUT 0	KOUT 1	KOUT 2	KOUT 3
(Pin No.) 50	(Pin Name) KIN 0	not used (open)	ERASE (S111)	TEL REC (S110)	not used (open)
51	KIN 1	FF (S109)	REW (S106)	LISTEN (S108)	STOP (S107)
52	KIN 2	REVERSE TIME			
		(Pin 1 of S112)	(Pin 2 of S112)	(Pin 3 of S112)	(Pin 4 of S112)
53	KIN 3	not used (open)	not used (open)	AUTO STOP (S103)	short

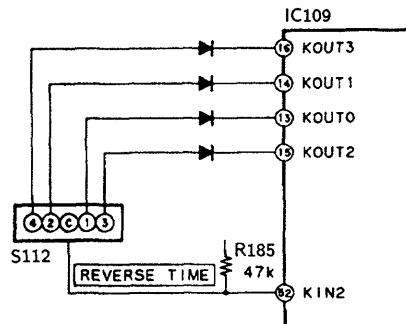
- Hard is controlled by Low active (Low is input with turning on each switch.)

AUTO STOP is turned "ON" at Low.

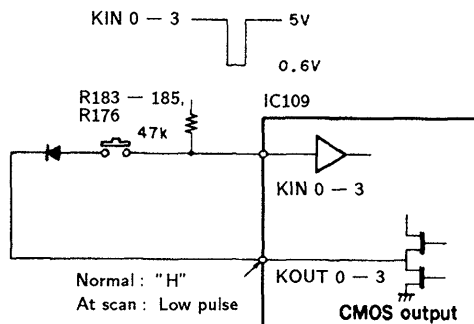
Refer to the following figure for the key matrix of S112.

S112 position ○ : ON

	0	1	2	3	4	5	6	7	8	9
Between C and 1		○		○		○		○		○
Between C and 2			○	○			○	○		
Between C and 3					○	○	○	○		
Between C and 4									○	○



- Key scan is controlled by Low active.



## 5. Detection of S Reel

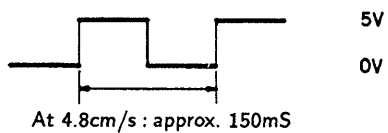
Pin 42, 43 of IC109 : S reel

Waveform condition :

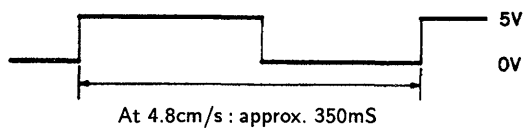
- Tape C-90 is used.
- The period is different by the tape position.

FWD :

S reel at the tape END

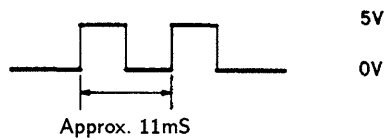


S reel at the tape TOP

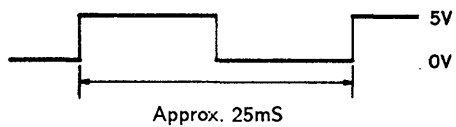


FF/REW :

S reel at the tape END



S reel at the tape TOP



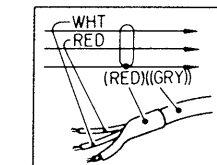


## ● SEMICONDUCTOR LOCATION

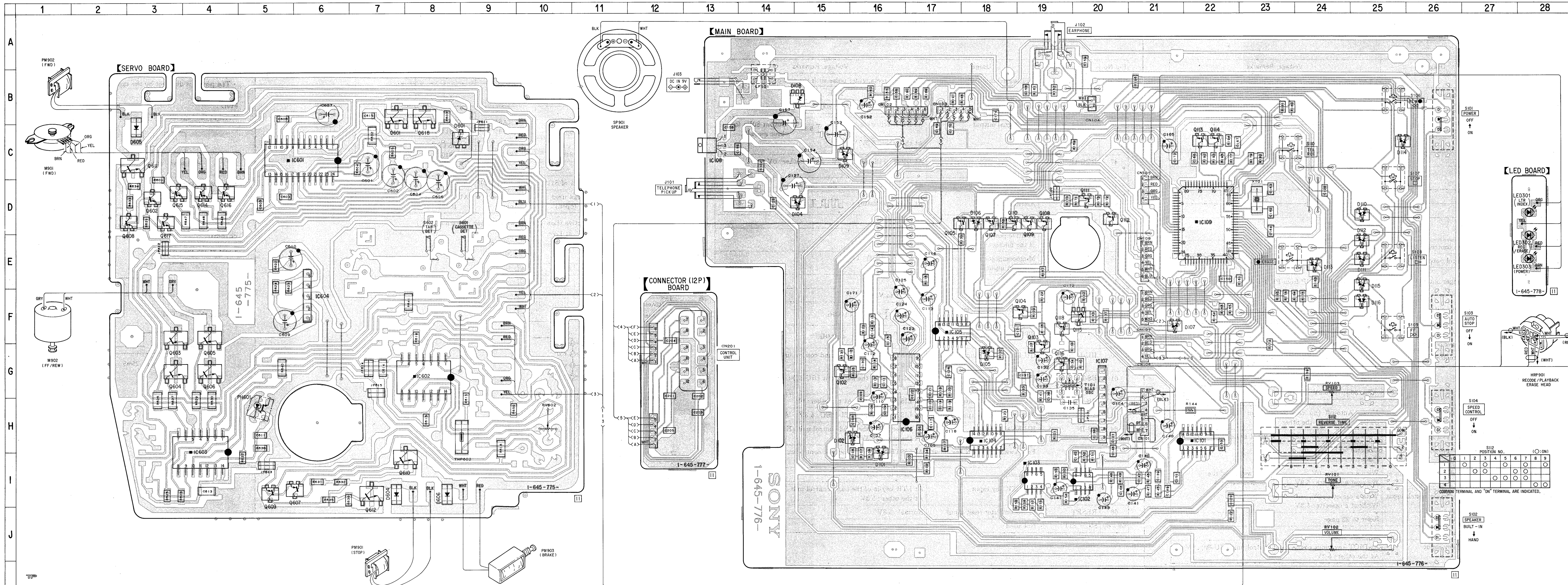
Ref. No.	Location	Ref. No.	Location
D101	H-18	Q102	G-15
D102	H-15	Q103	F-19
D104	D-14	Q104	F-18
D105	G-18	Q105	D-17
D106	D-18	Q107	D-18
D107	F-21	Q108	D-19
D108	B-14	Q109	D-19
D109	C-5	Q110	D-18
D110	D-24	Q111	D-20
D111	E-24	Q112	D-20
D112	E-24	Q113	C-22
D113	E-24	Q114	C-22
D114	C-25	Q115	F-19
D115	E-24	Q116	G-19
D116	F-24	Q118	F-19
D601	C-8	Q601	B-7
D604	I-7	Q602	D-3
D605	C-3	Q603	F-3
D606	I-8	Q604	G-3
		Q605	F-4
IC101	H-22	Q606	G-4
IC102	I-19	Q607	I-5
IC103	I-19	Q608	D-3
IC104	H-18	Q609	F-5
IC105	F-17	Q610	I-7
IC106	H-16	Q611	C-3
IC107	G-20	Q612	I-7
IC108	D-22	Q614	D-4
IC109	C-13	Q615	D-3
IC601	C-6	Q616	D-4
IC602	G-8	Q617	D-3
IC603	H-4	Q618	B-8
IC604	F-6		
PH601	H-5		

## Note:

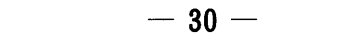
- Color code or sleeving over the end of the jacket.



- ○ : parts extracted from the component side.
- ● : parts extracted from the conductor side.
- ■ : parts mounted on the conductor side.
- ▨ : Pattern on the side which is seen.







## SECTION 6 EXPLODED VIEWS

### NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

### Color indication of Appearance Parts

Example:

KNOB, BALANCE (WHITE).... (RED)

Parts color

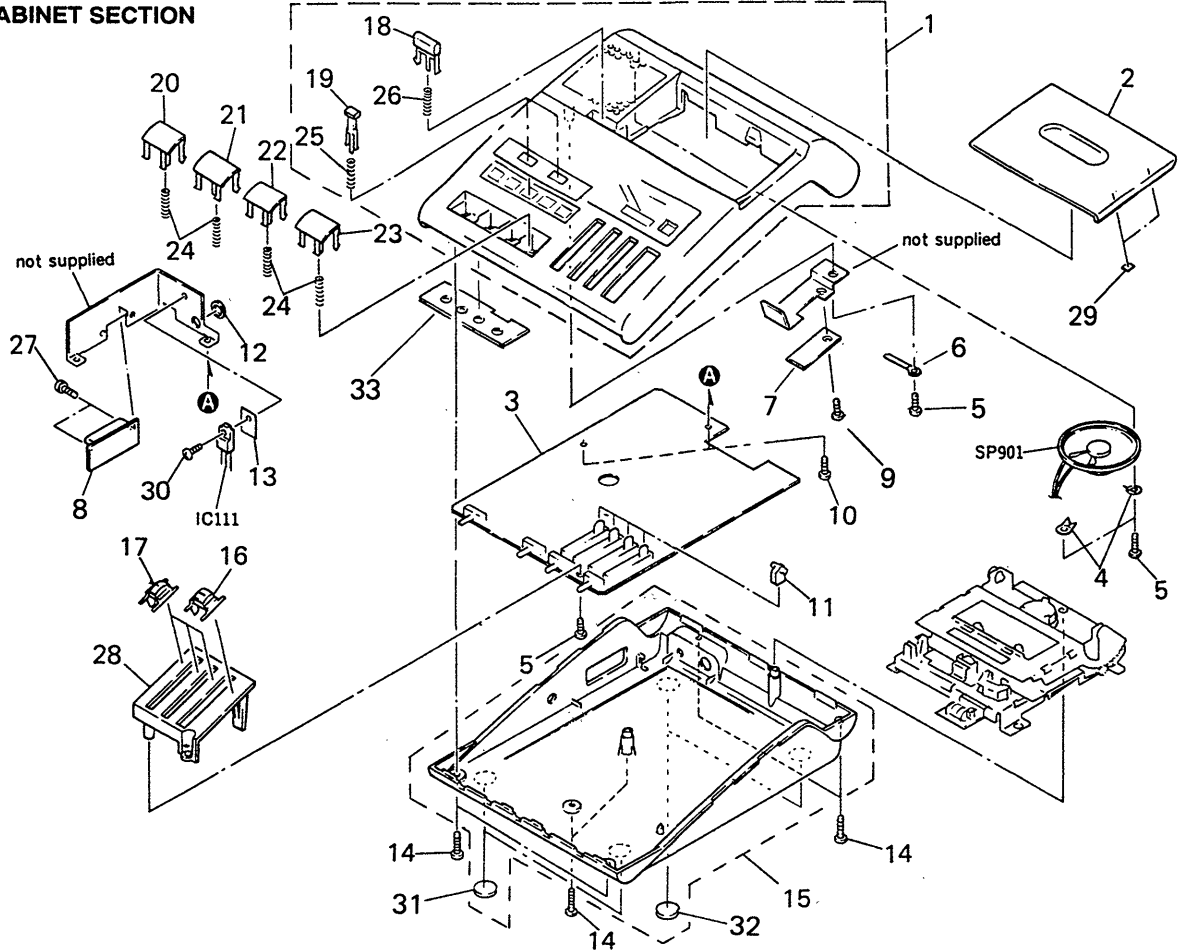
Cabinet's color

- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- The mechanical parts with no reference number in the exploded views are not supplied.

- Hardware (# mark) list is given in the last of this parts list.

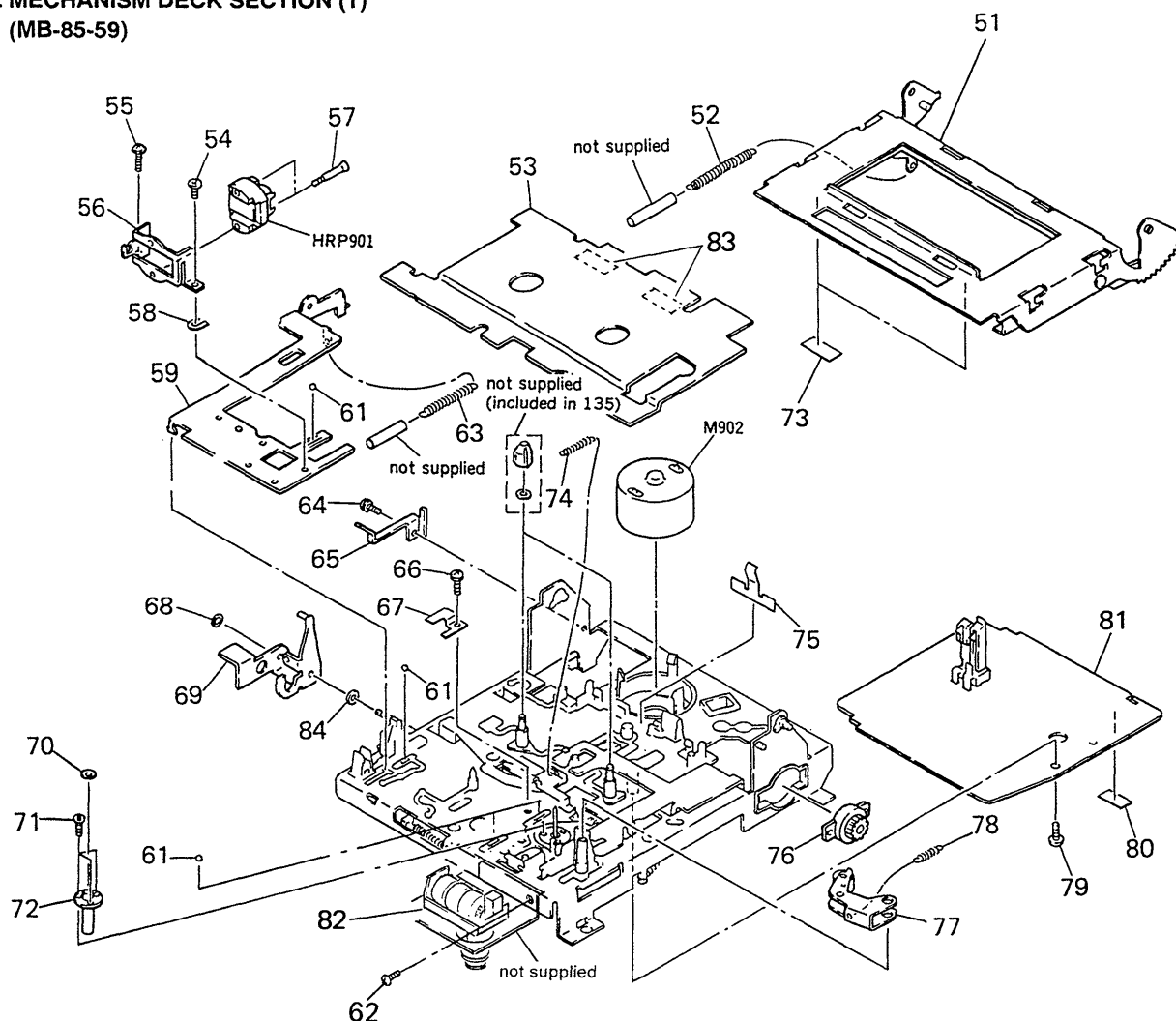
### 6-1. CABINET SECTION



Ref.No.	Part No.	Description	Remark	Ref.No.	Part No.	Description	Remark
1	X-3365-808-1	CABINET (FRONT) ASSY (BLACK) (Canadian, AEP, UK)		17	X-3323-536-1	KNOB (TONE) ASSY	
1	X-3365-812-1	CABINET (FRONT) ASSY (WHITE) (US)		18	3-323-693-01	BUTTON (EJECT) (BLACK) (Canadian, AEP, UK)	
2	X-3323-532-1	LID ASSY (CASSETTE) (BLACK) (Canadian, AEP, UK)		18	3-323-693-11	BUTTON (EJECT) (WHITE) (US)	
2	X-3365-810-1	LID (CASSETTE) ASSY (WHITE) (US)		19	3-323-695-01	BUTTON	
* 3	A-3060-587-A	MAIN BOARD, COMPLETE		20	3-323-698-01	BUTTON (MD) (REW)	
4	3-845-110-00	RETAINER, SPEAKER		21	3-323-697-01	BUTTON (STOP)	
5	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S		22	3-323-698-11	BUTTON (MD) (LISTEN)	
6	3-701-822-00	HOLDER, WIRE		23	3-323-698-21	BUTTON (MD) (FF)	
* 7	1-645-778-11	PC BOARD, LED		24	3-323-696-01	SPRING, COMPRESSION	
* 8	1-645-777-11	PC BOARD, CONNECTOR (12P)		25	3-323-694-01	SPRING, COMPRESSION	
9	7-621-772-10	SCREW +B 2X4		26	3-323-692-01	SPRING, COMPRESSION	
10	7-682-547-04	SCREW +BVTT 3X6 (S)		27	7-621-770-XX	SCREW +P 2.6X8	
* 11	3-323-679-01	BUSHING		28	3-359-104-01	GUIDE, KNOB (BLACK) (Canadian, AEP, UK)	
* 12	3-323-680-01	COVER, JACK		28	3-359-104-11	GUIDE, KNOB (WHITE) (US)	
13	4-391-336-01	SHEET, INSULATING		29	3-363-245-01	CUSHION	
14	7-685-648-79	SCREW +BVTP 3X12 TYPE2 N-S		30	7-682-548-04	SCREW +B 3X8	
15	X-3365-809-1	CABINET (REAR) ASSY (BLACK) (Canadian, AEP, UK)		31	3-343-250-01	CUSHION	
15	X-3365-813-1	CABINET (REAR) ASSY (WHITE) (US)		32	3-329-013-01	FOOT, RUBBER	
16	X-3323-535-1	KNOB (VOL) ASSY		33	3-382-000-01	PLATE, MD BUTTON	
				SP901	1-504-172-11	SPEAKER	

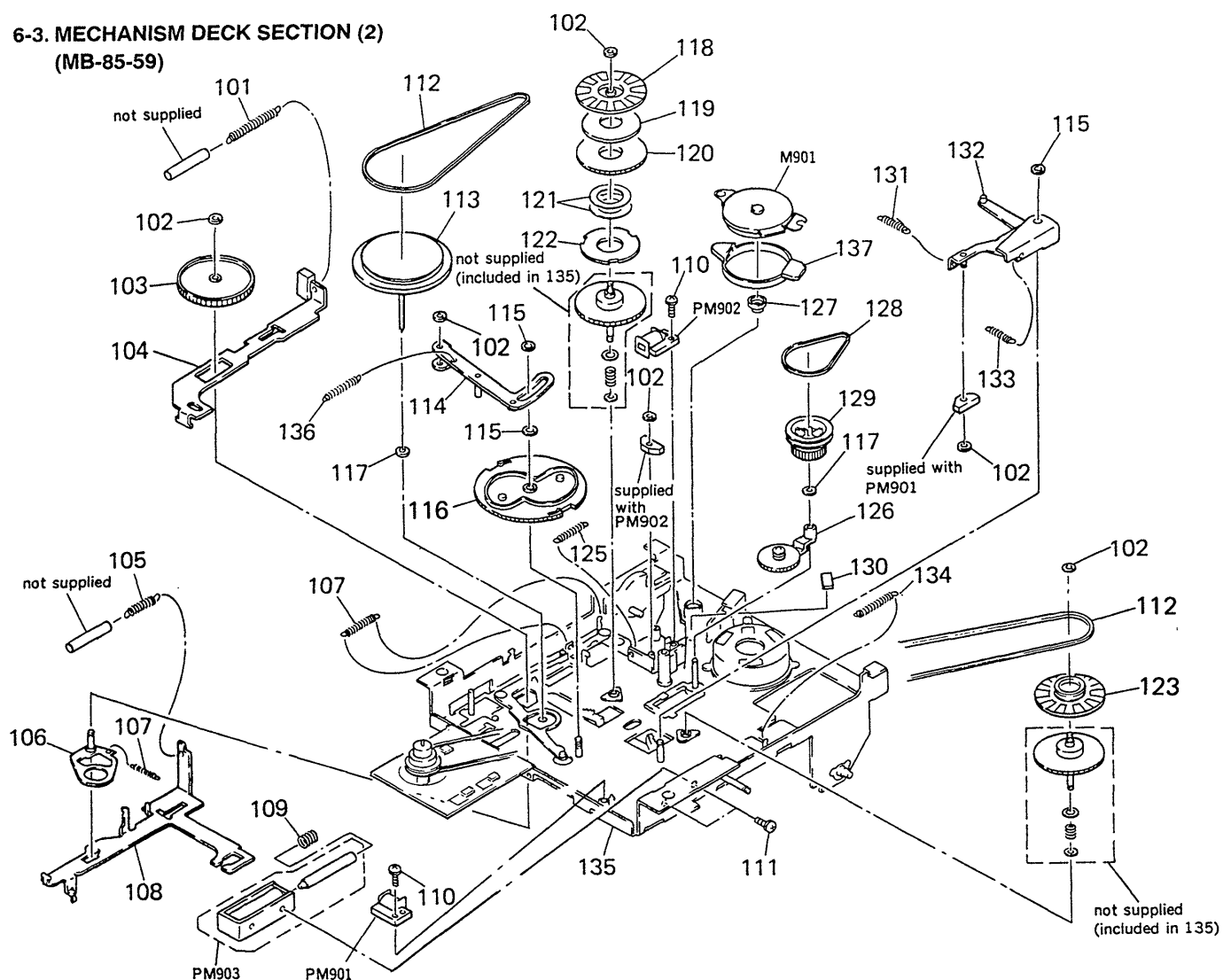


**6-2. MECHANISM DECK SECTION (1)**  
(MB-85-59)



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	X-3323-552-1	HOLDER ASSY, CASSETTE		* 69	X-3323-551-1	LEVER (EJECT) ASSY	
52	3-359-163-01	SPRING, TENSION		70	3-325-698-01	RING, RETAINING	
53	3-359-159-01	PANEL (REEL)		71	7-627-551-58	SCREW, PRECISION +P 1.4X3	
54	7-627-553-27	SCREW, PRECISION +P 2X2.5		72	3-359-152-01	BEARING, CAPSTAN	
55	7-621-771-06	SCREW, LOCK		73	3-363-246-01	CUSHION (CH)	
* 56	3-359-144-01	HOLDER (HEAD)		74	3-305-902-00	SPRING, TENSION	
57	4-920-347-01	SCREW, HEAD		75	3-359-125-01	SPRING (CASSETTE RETAINER)	
58	3-578-138-01	SHIM (t=0.1)		76	3-343-248-01	DAMPER (P), SMALL	
58	3-578-138-11	SHIM (t=0.2)		77	X-3323-550-1	PINCH LEVER ASSY	
* 59	3-359-140-01	CHASSIS, HEAD		78	3-359-164-01	SPRING, TENSION	
61	7-671-111-11	STEEL, BOUL 1.5MM		79	7-685-133-19	SCREW +BTP 2.6X6 TYPE2 N-S	
62	7-621-770-87	SCREW +BVTT 2.6X5 (S)		80	3-831-441-11	CUSHION (B)	
63	3-583-501-00	SPRING, TENSION		* 81	A-3016-265-A	SERVO BOARD, COMPLETE	
64	7-628-253-00	SCREW +PS 2X4		82	1-251-057-11	COUNTER, TAPE	
* 65	3-359-126-01	SPRING (CASSETTE HOLDER)		83	3-831-441-XX	CUSHION	
66	7-628-253-90	SCREW +PS 2.6X4		84	3-701-439-11	WASHER	
67	3-323-520-01	SPRING		HRP901	1-543-564-11	HEAD, MAGNETIC (REC/PB/ERASE)	
68	3-307-948-21	WASHER, NYLON		M902	X-3362-206-1	MOTOR ASSY (F/R)	

### 6-3. MECHANISM DECK SECTION (2) (MB-85-59)



Ref. No.	Part No.	Description	Remark
101	3-359-161-01	SPRING, TENSION	
102	3-307-948-01	WASHER, NYLON	
103	3-362-606-01	GEAR (FWD IDLER)	
* 104	X-3323-544-1	PLATE ASSY, FUNCTION, FWD	
105	3-359-162-01	SPRING, TENSION	
106	X-3323-501-1	LEVER ASSY, F. I	
107	3-509-127-00	SPRING, TENSION	
* 108	3-359-153-01	LEVER (FWD)	
109	3-359-160-01	SPRING, COMPRESSION	
110	7-628-253-40	SCREW +PS 2X10	
111	7-628-253-90	SCREW +PS 2.6X4	
112	3-359-158-01	BELT (FWD)	
113	X-3362-056-1	FLYWHEEL ASSY	
* 114	X-3323-545-1	ARM (FWD DRIVING) ASSY	
115	3-307-948-21	WASHER, NYLON	
116	3-359-154-01	GEAR (CAM)	
117	3-701-437-01	WASHER	
118	3-359-155-01	REFLECTOR	
119	3-307-313-00	PLATE, YOKE	
120	3-307-953-00	MAGNET, REEL TABLE	
121	3-307-493-01	SPACER (t=0.1)	
121	3-307-493-11	SPACER (t=0.15)	
121	3-307-493-21	SPACER (t=0.2)	

Ref. No.	Part No.	Description	Remark
122	3-561-827-00	PLATE (A), HYSTERESIS	
123	3-384-239-01	PULLEY (REFLECTOR)	
125	3-309-031-00	SPRING, TENSION	
126	X-3323-547-1	GEAR (F/R) ASSY	
* 127	3-362-434-01	CUSHION (M2)	
128	3-379-468-01	BELT (F/R)	
129	3-359-156-01	IDLER (F/R)	
130	3-362-473-01	CUSHION (M3)	
131	3-533-223-00	SPRING, TENSION	
* 132	X-3323-543-1	PLATE ASSY, FUNCTION, STOP	
133	3-542-649-00	SPRING, TENSION	
134	3-642-490-00	SPRING, TENSION	
135	A-3035-282-A	CHASSIS ASSY	
136	3-555-212-00	SPRING, TENSION	
* 137	3-362-433-01	CUSHION (M)	
M901	1-541-748-11	MOTOR (NBL-122B) (FWD)	
PM901	1-454-459-31	SOLENOID, PLUNGER (STOP)	
PM902	1-454-459-21	SOLENOID, PLUNGER (FWD)	
PM903	1-454-509-11	SOLENOID, PLUNGER (BRAKE)	



## MAIN

Ref. No.	Part No.	Description	Remark
C151	1-163-117-00	CERAMIC CHIP 100PF	5% 50V
C152	1-126-154-11	ELECT 47uF	20% 6.3V
C153	1-125-734-11	CAP, DOUBLE LAYEYER	0.1F
C154	1-124-472-11	ELECT 470uF	20% 10V
C155	1-163-077-00	CERAMIC CHIP 0.1uF	10% 25V
C156	1-163-077-00	CERAMIC CHIP 0.1uF	10% 25V
C157	1-124-898-11	ELECT 4700uF	20% 16V
C158	1-163-035-00	CERAMIC CHIP 0.047uF	50V
C159	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C160	1-163-077-00	CERAMIC CHIP 0.1uF	10% 25V
C161	1-163-117-00	CERAMIC CHIP 100PF	5% 50V
C162	1-163-239-11	CERAMIC CHIP 33PF	5% 50V
C163	1-163-239-11	CERAMIC CHIP 33PF	5% 50V
C164	1-163-077-00	CERAMIC CHIP 0.1uF	10% 25V
C165	1-124-584-00	ELECT 100uF	20% 10V
C166	1-163-037-11	CERAMIC CHIP 0.022uF	10% 25V
C167	1-163-077-00	CERAMIC CHIP 0.1uF	10% 25V
C168	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C169	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V
C170	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C171	1-124-903-11	ELECT 1uF	20% 50V
C172	1-124-234-00	ELECT 22uF	20% 16V
C173	1-163-077-00	CERAMIC CHIP 0.1uF	10% 25V
C174	1-163-077-00	CERAMIC CHIP 0.1uF	10% 25V
< CONNECTOR >			
CN101	1-506-472-11	PIN, CONNECTOR 7P	
CN102	1-506-471-11	PIN, CONNECTOR 6P	
CN103	1-506-470-11	PIN, CONNECTOR 5P	
CN104	1-506-467-11	PIN, CONNECTOR 2P	
CN105	1-506-469-11	PIN, CONNECTOR 4P	
CN106	1-506-469-11	PIN, CONNECTOR 4P	
CN107	1-506-470-11	PIN, CONNECTOR 5P	
CN108	1-506-471-11	PIN, CONNECTOR 6P	
< DIODE >			
D101	8-719-400-18	DIODE MA152WK	
D102	8-719-800-76	DIODE 1SS226	
D104	8-719-820-05	DIODE 1SS181	
D105	8-719-400-18	DIODE MA152WK	
D106	8-719-400-18	DIODE MA152WK	
D107	8-719-820-05	DIODE 1SS181	
D108	8-719-938-78	DIODE SB10-05PCP	
D109	8-719-820-05	DIODE 1SS181	
D110	8-719-400-18	DIODE MA152WK	
D111	8-719-820-05	DIODE 1SS181	
D112	8-719-820-05	DIODE 1SS181	
D113	8-719-820-05	DIODE 1SS181	

Ref. No.	Part No.	Description	Remark
D114	8-719-820-05	DIODE 1SS181	
D115	8-719-820-05	DIODE 1SS181	
D116	8-719-400-18	DIODE MA152WK	
< IC >			
IC101	8-759-008-79	IC MC14011BF	
IC102	8-759-745-64	IC NJM4560M	
IC103	8-759-925-05	IC LM2903PS	
IC104	8-759-008-67	IC MC14066BF	
IC105	8-759-008-67	IC MC14066BF	
IC106	8-759-230-04	IC TA7628HP	
IC107	8-759-143-54	IC uPC1330HA	
IC108	8-759-148-79	IC uPC2406HF	
IC109	8-759-081-10	IC uPD75308GF-J16-3B9	
< JACK >			
J101	1-566-891-21	JACK (TELEPHONE PICKUP)	
J102	1-566-891-21	JACK (EARPHONE)	
J103	1-568-727-31	JACK, DC (DC IN 9V)	
< JUMPER RESISTOR >			
JP101	1-216-296-00	METAL CHIP 0 5% 1/8W	
JP102	1-216-296-00	METAL CHIP 0 5% 1/8W	
< LINE FILTER >			
LF101	1-424-361-11	FILTER, LINE	
< TRANSISTOR >			
Q102	8-729-800-37	TRANSISTOR 2SD1048-X7	
Q103	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q104	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q105	8-729-805-94	TRANSISTOR 2SC4047	
Q107	8-729-805-94	TRANSISTOR 2SC4047	
Q108	8-729-805-94	TRANSISTOR 2SC4047	
Q109	8-729-805-94	TRANSISTOR 2SC4047	
Q110	8-729-805-91	TRANSISTOR 2SA1563	
Q111	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q112	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q113	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q114	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q115	8-729-101-07	TRANSISTOR 2SB798-DL	
Q116	8-729-800-37	TRANSISTOR 2SD1048-X7	
Q118	8-729-805-91	TRANSISTOR 2SA1563	
< RESISTOR >			
R101	1-216-043-00	METAL CHIP 560 5% 1/10W	
R102	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R103	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R104	1-216-049-00	METAL CHIP 1K 5% 1/10W	

## MAIN

Ref. No.	Part No.	Description	Remark		
R105	1-216-097-00	METAL CHIP	100K	5%	1/10W
R106	1-216-049-00	METAL CHIP	1K	5%	1/10W
R107	1-216-111-00	METAL CHIP	390K	5%	1/10W
R108	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R109	1-216-041-00	METAL CHIP	470	5%	1/10W
R110	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R113	1-216-089-00	METAL CHIP	47K	5%	1/10W
R114	1-216-027-00	METAL CHIP	120	5%	1/10W
R115	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R116	1-216-037-00	METAL CHIP	330	5%	1/10W
R117	1-216-029-00	METAL CHIP	150	5%	1/10W
R118	1-216-085-00	METAL CHIP	33K	5%	1/10W
R119	1-216-083-00	METAL CHIP	27K	5%	1/10W
R120	1-216-105-00	METAL CHIP	220K	5%	1/10W
R121	1-216-097-00	METAL CHIP	100K	5%	1/10W
R122	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R123	1-216-109-00	METAL CHIP	330K	5%	1/10W
R124	1-216-085-00	METAL CHIP	33K	5%	1/10W
R125	1-216-097-00	METAL CHIP	100K	5%	1/10W
R126	1-216-109-00	METAL CHIP	330K	5%	1/10W
R127	1-216-037-00	METAL CHIP	330	5%	1/10W
R129	1-216-049-00	METAL CHIP	1K	5%	1/10W
R130	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R131	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R132	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R133	1-216-097-00	METAL CHIP	100K	5%	1/10W
R137	1-216-228-00	METAL GLAZE	18K	5%	1/8W
R138	1-216-035-00	METAL CHIP	270	5%	1/10W
R140	1-216-073-00	METAL CHIP	10K	5%	1/10W
R141	1-216-077-00	METAL CHIP	15K	5%	1/10W
R142	1-216-097-00	METAL CHIP	100K	5%	1/10W
R143	1-216-049-00	METAL CHIP	1K	5%	1/10W
R144	1-215-883-11	METAL OXIDE	33	5%	2W F
R145	1-216-073-00	METAL CHIP	10K	5%	1/10W
R146	1-216-091-00	METAL CHIP	56K	5%	1/10W
R147	1-216-081-00	METAL CHIP	22K	5%	1/10W
R148	1-216-043-00	METAL CHIP	560	5%	1/10W
R149	1-216-037-00	METAL CHIP	330	5%	1/10W
R150	1-216-081-00	METAL CHIP	22K	5%	1/10W
R151	1-216-115-00	METAL CHIP	560K	5%	1/10W
R152	1-216-077-00	METAL CHIP	15K	5%	1/10W
R153	1-216-049-00	METAL CHIP	1K	5%	1/10W
R154	1-216-105-00	METAL CHIP	220K	5%	1/10W
R155	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R156	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R157	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R158	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R159	1-216-188-00	METAL GLAZE	390	5%	1/8W

Ref. No.	Part No.	Description	Remark		
R160	1-216-041-00	METAL CHIP	470	5%	1/10W
R161	1-216-017-00	METAL CHIP	47	5%	1/10W
R162	1-216-017-00	METAL CHIP	47	5%	1/10W
R163	1-216-152-00	METAL GLAZE	12	5%	1/8W
R164	1-216-049-00	METAL CHIP	1K	5%	1/10W
R165	1-216-049-00	METAL CHIP	1K	5%	1/10W
R166	1-216-049-00	METAL CHIP	1K	5%	1/10W
R167	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R168	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R169	1-216-089-00	METAL CHIP	47K	5%	1/10W
R170	1-216-105-00	METAL CHIP	220K	5%	1/10W
R171	1-216-089-00	METAL CHIP	47K	5%	1/10W
R172	1-216-089-00	METAL CHIP	47K	5%	1/10W
R173	1-216-073-00	METAL CHIP	10K	5%	1/10W
R174	1-216-097-00	METAL CHIP	100K	5%	1/10W
R175	1-216-089-00	METAL CHIP	47K	5%	1/10W
R176	1-216-089-00	METAL CHIP	47K	5%	1/10W
R177	1-216-089-00	METAL CHIP	47K	5%	1/10W
R179	1-216-089-00	METAL CHIP	47K	5%	1/10W
R180	1-216-089-00	METAL CHIP	47K	5%	1/10W
R181	1-216-089-00	METAL CHIP	47K	5%	1/10W
R182	1-216-089-00	METAL CHIP	47K	5%	1/10W
R183	1-216-089-00	METAL CHIP	47K	5%	1/10W
R184	1-216-089-00	METAL CHIP	47K	5%	1/10W
R185	1-216-089-00	METAL CHIP	47K	5%	1/10W
R186	1-216-049-00	METAL CHIP	1K	5%	1/10W
R188	1-216-049-00	METAL CHIP	1K	5%	1/10W
R189	1-216-049-00	METAL CHIP	1K	5%	1/10W
R190	1-216-049-00	METAL CHIP	1K	5%	1/10W
R191	1-216-049-00	METAL CHIP	1K	5%	1/10W
R192	1-216-081-00	METAL CHIP	22K	5%	1/10W
R193	1-216-089-00	METAL CHIP	47K	5%	1/10W
R194	1-216-080-00	METAL CHIP	20K	5%	1/10W
R195	1-216-097-00	METAL CHIP	100K	5%	1/10W
R196	1-216-037-00	METAL CHIP	330	5%	1/10W
< VARIABLE RESISTOR >					
RV101	1-230-564-11	RES, VAR, SLIDE 10K (TONE)			
RV102	1-230-564-11	RES, VAR, SLIDE 10K (VOLUME)			
RV103	1-237-364-11	RES, VAR, SLIDE 100K (SPEED)			
< SWITCH >					
S101	1-572-251-11	SWITCH, SLIDE (POWER)			
S102	1-572-251-11	SWITCH, SLIDE (SPEAKER)			
S103	1-572-251-11	SWITCH, SLIDE (AUTO STOP)			
S104	1-572-251-11	SWITCH, SLIDE (SPEED CONTROL)			
S106	1-554-303-21	SWITCH, TACTILE (REW ◀ )			
S107	1-554-303-21	SWITCH, TACTILE (STOP ■ )			

MAIN

SERVO

Ref. No.	Part No.	Description	Remark
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S108	1-554-303-21	SWITCH, TACTILE (LISTEN ►)	
S109	1-554-303-21	SWITCH, TACTILE (FF ►►)	
S110	1-554-303-21	SWITCH, TACTILE (TEL REC)	
S111	1-554-303-21	SWITCH, TACTILE (ERASE)	
S112	1-570-361-11	SWITCH, SLIDE (DIGITAL CORD) (REVERSE TIME)	

## &lt; TRANSFORMER &gt;

T101	1-433-251-00	TRANSFORMER, BIAS OSCILLATOR	
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## &lt; VIBRATOR &gt;

X101	1-577-273-11	OSCILLATOR, CERAMIC (4.19MHz)	
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*	A-3016-265-A	SERVO BOARD, COMPLETE	
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## &lt; CAPACITOR &gt;

C601	1-124-903-11	ELECT	1uF	20%	50V
C602	1-124-257-00	ELECT	2.2uF	20%	50V
C603	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C604	1-124-257-00	ELECT	2.2uF	20%	50V
C605	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C606	1-124-257-00	ELECT	2.2uF	20%	50V
C607	1-124-257-00	ELECT	2.2uF	20%	50V
C608	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C609	1-126-154-11	ELECT	47uF	20%	6.3V
C610	1-124-257-00	ELECT	2.2uF	20%	50V
C611	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C613	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C614	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C615	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V

## &lt; DIODE &gt;

D601	8-719-105-45	DIODE	RD3. 3M-B1
D604	8-719-510-38	DIODE	D1F10
D605	8-719-510-38	DIODE	D1F10
D606	8-719-510-38	DIODE	D1F10

## &lt; IC &gt;

IC601	8-759-821-20	IC	LB1672M
IC602	8-759-008-67	IC	MC14066BF
IC603	8-759-925-80	IC	SN74HC14ANS
IC604	8-759-801-12	IC	LA5523

Ref. No.	Part No.	Description	Remark
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## &lt; JUMPER RESISTOR &gt;

JP611	1-216-296-00	METAL CHIP	0 5% 1/8W
JP612	1-216-296-00	METAL CHIP	0 5% 1/8W
JP613	1-216-296-00	METAL CHIP	0 5% 1/8W
JP614	1-216-296-00	METAL CHIP	0 5% 1/8W
JP615	1-216-296-00	METAL CHIP	0 5% 1/8W

## &lt; PHOTO INTERRUPTER &gt;

PH601	8-719-939-23	DIODE	GP-2S09-C
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## &lt; TRANSISTOR &gt;

Q601	8-729-140-75	TRANSISTOR	2SD999-CLCK
Q602	8-729-900-53	TRANSISTOR	DTC114EK
Q603	8-729-101-07	TRANSISTOR	2SB798-DL
Q604	8-729-140-75	TRANSISTOR	2SD999-CLCK
Q605	8-729-101-07	TRANSISTOR	2SB798-DL
Q606	8-729-140-75	TRANSISTOR	2SD999-CLCK
Q607	8-729-901-46	TRANSISTOR	DTA114YK
Q608	8-729-901-46	TRANSISTOR	DTA114YK
Q609	8-729-901-46	TRANSISTOR	DTA114YK
Q610	8-729-140-75	TRANSISTOR	2SD999-CLCK
Q611	8-729-140-75	TRANSISTOR	2SD999-CLCK
Q612	8-729-140-75	TRANSISTOR	2SD999-CLCK
Q614	8-729-141-48	TRANSISTOR	2SB624-BV345
Q615	8-729-141-48	TRANSISTOR	2SB624-BV345
Q616	8-729-141-48	TRANSISTOR	2SB624-BV345
Q617	8-729-900-98	TRANSISTOR	DTC143TK
Q618	8-729-140-75	TRANSISTOR	2SD999-CLCK

## &lt; RESISTOR &gt;

R601	1-216-073-00	METAL CHIP	10K 5% 1/10W
R602	1-216-198-00	METAL CHIP	1K 5% 1/8W
R603	1-216-033-00	METAL CHIP	220 5% 1/10W
R604	1-216-073-00	METAL CHIP	10K 5% 1/10W
R605	1-216-035-00	METAL CHIP	270 5% 1/10W
R615	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
R616	1-216-223-00	METAL GLAZE	11K 5% 1/8W
R618	1-216-089-00	METAL CHIP	47K 5% 1/10W
R619	1-216-089-00	METAL CHIP	47K 5% 1/10W
R621	1-216-073-00	METAL CHIP	10K 5% 1/10W
R622	1-216-041-00	METAL CHIP	470 5% 1/10W
R623	1-216-073-00	METAL CHIP	10K 5% 1/10W
R624	1-216-089-00	METAL CHIP	47K 5% 1/10W
R625	1-216-089-00	METAL CHIP	47K 5% 1/10W
R626	1-216-198-00	METAL CHIP	1K 5% 1/8W
R627	1-216-198-00	METAL CHIP	1K 5% 1/8W
R628	1-216-089-00	METAL CHIP	47K 5% 1/10W
R629	1-216-198-00	METAL CHIP	1K 5% 1/8W

SERVO

Ref.No.	Part No.	Description	Remark		
R630	1-216-198-00	METAL CHIP	1K	5%	1/8W
R631	1-216-037-00	METAL CHIP	330	5%	1/10W
R632	1-216-097-00	METAL CHIP	100K	5%	1/10W
R633	1-216-037-00	METAL CHIP	330	5%	1/10W
R634	1-216-097-00	METAL CHIP	100K	5%	1/10W
R635	1-216-037-00	METAL CHIP	330	5%	1/10W
R636	1-216-025-00	METAL CHIP	100	5%	1/10W
R637	1-216-031-00	METAL CHIP	180	5%	1/10W
R638	1-216-089-00	METAL CHIP	47K	5%	1/10W
R639	1-216-089-00	METAL CHIP	47K	5%	1/10W
R640	1-216-222-00	METAL GLAZE	10K	5%	1/8W
R641	1-216-238-00	METAL GLAZE	47K	5%	1/8W
R646	1-216-186-00	METAL GLAZE	330	5%	1/8W
R647	1-216-186-00	METAL GLAZE	330	5%	1/8W
R648	1-216-186-00	METAL GLAZE	330	5%	1/8W
R650	1-216-058-00	METAL GLAZE	2.4K	5%	1/10W

< VARIABLE RESISTOR >

RV602 1-237-604-11 RES. ADJ. METAL GRAZE 4.7K

< SWITCH >

S601 1-572-248-11 SWITCH, LEAF (CASSETTE DET)  
S602 1-571-281-11 SWITCH, LEAF (TAB DET)

< THERMISTOR(POSITIVE) >

THP602 1-809-133-11 THERMISTOR (POSITIVE)

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MISCELLANEOUS  
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82 1-251-057-11 COUNTER, TAPE  
HRP901 1-543-564-11 HEAD, MAGNETIC (REC/PB/ERASE)  
M901 1-541-748-11 MOTOR (NBL-122B) (FWD)  
M902 X-3362-206-1 MOTOR ASSY (F/R)  
  
PM901 1-454-459-31 SOLENOID, PLUNGER (STOP)  
PM902 1-454-459-21 SOLENOID, PLUNGER (FWD)  
PM903 1-454-509-11 SOLENOID, PLUNGER (BRAKE)  
SP901 1-504-172-11 SPEAKER

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Ref.No.	Part No.	Description	Remark
ACCESSORIES & PACKING MATERIALS *****			
△	1-465-393-11	ADAPTOR, AC (US, Canadian)	
△	1-465-428-11	ADAPTOR, AC (UK)	
△	1-465-429-11	ADAPTOR, AC (AEP)	
*	3-359-174-01	CUSHION (L)	
*	3-359-175-01	CUSHION (R)	
*	3-383-844-01	INDIVIDUAL CARTON	
	3-755-946-11	MANUAL, INSTRUCTION (ENGLISH/FRENCH/ GERMAN/SPANISH) (Canadian, AEP, UK)	
	3-755-946-21	MANUAL, INSTRUCTION (ENGLISH) (US)	
*	4-950-766-01	LABEL, FCC DIGITAL DEVICE (US)	

The components identified by mark △ or dotted line with mark. △ are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.